Land use in Wah Wah and Pine Valleys, western Utah

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by
Joseph R. Murdock
and
Stanley L. Welsh

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Frontispiece A. Rabbitbrush, halogeon, and other shrubs, southeast quarter of Wah Wah Valley.

Frontispiece B. Galleta grass and desert shrubs, southwest quarter of Pine Valley.
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LAND USE IN WAH WAH AND PINE VALLEYS, WESTERN UTAH

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ABSTRACT

This is a review of the use of public lands in Wah Wah and Pine Valleys in western Utah for grazing of livestock, mining, and other private enterprises. The total area of the two valleys is approximately 1,440 square miles of which about 30 square miles are privately owned. From the time grazing of domestic livestock was initiated in the 1870's and 1880's until 1934, the land was free public domain and was grazed on a first-come, first-served basis. Passage of the Taylor Grazing Act in 1934 ended free use of public lands. Existing evidence indicates that by 1934 the grazing base was badly depleted. In the period from 1934 until the early 1950's, the Bureau of Land Management policies resulted in a general evaluation of range conditions; and since the 1950's policies such as reclamation of pinyon and juniper lands by clearing and seeding have made possible the better distribution of livestock on a seasonal basis and the determination of proper stocking rates. Adjudication of Pine Valley in 1956 and Wah Wah Valley in 1962 have allowed for general improvement of range conditions. Certain abuses of public lands still exist as evidenced by poor control of road building, mining exploration, and predator control practices.

INTRODUCTION

Wah Wah and Pine Valleys are located in western Millard and Beaver Counties, Utah, in the southeastern portion of the Great Basin (Map 1). To the east of Wah Wah Valley lie the San Francisco Mountains and west of Pine Valley the Needle Mountains. The valleys average about 50 miles in length and 10 to 20 miles in width. The combined area is about 1,440 square miles. About 1,240 square miles of land in the region is under Federal control. Of this total, 87 square miles is included in the Forest Service, Intermountain Forest and Range Experiment Station, Desert Experimental Range, and about 1,153 square miles are controlled by the Federal Bureau of Land Management. The remainder of the region is owned by the State of Utah (about 170 square miles) or is in private ownership (about 30 square miles). Land in the vicinity of Indian Peak designated as Indian Reservation has been purchased by the Utah State Fish and Game Board (Hancock, 1969) and is included in the State lands total.

The climate of the region is marked by great temperature extremes, scanty precipitation, and strong, drying winds of almost daily occurrence. The average annual precipitation in the center of Pine Valley over a 24-year period is only 6.1 inches (Holmgren, 1969). The mountains receive heavier amounts (e.g. 17.9 inches annually on the Needle Range) and are snow covered each year, but the valley bottoms are seldom snow covered for more than a few days or weeks. Daily and seasonal fluctuations in temperature are great, with extremes of 100°F in summer and -35°F in winter (Stewart, et al., 1940).

Springs and streams are few in number and are located in the mountains above the valley floors. Permanent streams are small and sink before they reach the valley bottoms.

Vegetation is composed of species typical of the Northern Desert Shrub Biome. The valley bottoms are occupied by sparse shrub and shrub-grass vegetative types (Map 2). Major plant species are shadscale, winterfat, budsage, black sagebrush, big sagebrush, rabbitbrush, horsebrush, and grasses. At elevations above the shrub types and interfingered downward with them is the juniper-pinyon community. This is the most important woodland type covering thousands of acres in the foothills and mountains. Various

1This study was made possible by a grant from the Public Land Law Review Commission to the Rocky Mountain Center on Environment, Denver, Colorado.

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grasses are abundant in the subtypes of this community. Scattered stands of Douglas-fir, white fir, bristlecone pine, ponderosa pine and aspen occur at higher elevations in the mountains.

In this setting was impressed the grazing of livestock and the attendant road building, fence construction, water development, and other activities which were to result in long-lasting changes in vegetation, scars on the landscape, soil erosion, and changes in water runoff.

The region has been used primarily for winter grazing of livestock, but some portions were utilized throughout the year and others only in the summer. The winter range is dry, for there are only a few, small, widely dispersed springs, but the twigs of dormant shrubs are palatable and nutritious, and the dry grasses provide energy. Light snow cover provides water for the animals but seldom diminishes the availability of forage. As snow recedes from the valley and benches, sheep can be driven to the hills where drifts remain longer, and the early sheepmen found that by following the snow, which is used for stock water, they could use the desert ranges in the winter. As sheep populations grew, it became necessary to trail them farther into the deserts for feed. Through co-operative efforts, the sheepmen developed the more

Legend:
1. Shadscale-winterfat-grass.
2. Shadscale-gray molly.
3. Rabbitbrush-winterfat-grass.
5. Winterfat.
10. Greasewood.

Map 2. Vegetation types in Wah Wah and Pine Valleys (after Stewart et al., 1940).
productive springs and built catchments for rainfall runoff to provide water for animals moving over the

ENIRONMENTAL IMPACT AND PROBLEM ORIGINS

Historical

The historical background of Pine and Wah Wah Valleys might be characterized by an epitaph from a tombstone (Fig. 1) at a cemetery at Wah Wah Springs on the west side of Wah Wah Valley. It states: “Green is the turf above the husband of my better days, none knew thee but to love, none named thee but to praise.” The turf, if it ever existed, was probably seldom green, but the vegetation was the basis upon which settlements were established, and a way of life was developed.

The two valleys have not received the same amount or type of utilization. Wah Wah Valley is situated more closely to Milford and other population centers than is Pine Valley, Ore was discovered in the San Francisco Mountains in the late 1860’s, and the mining town of Frisco arose, functioned, and failed upon removal of the rich ores (Fig. 2). Frisco had a population of some 4,000 during its heyday and was a major receiver of meat and other products such as charcoal from neighboring Wah Wah and Pine Valleys. It was also the railhead for the Utah Central Railroad. The railroad was later extended from Frisco to the ore processing town of Newhouse (Fig. 3) which was built on the slopes of the eastern side of Wah Wah Valley. Water was piped from Wah Wah Spring (Fig. 4) on the west side of the Valley eastward to Newhouse. A sheep-shearing shed and corrals were built adjacent to Newhouse (Fig. 5). The sheds in which some 200,000 head of sheep were reported to have been sheared annually, are still standing but unused. Both Frisco and Newhouse survive only as mine or slag dumps (Fig. 6), foundations (Fig. 3) and a cemetery (Fig. 7).

No such concentration of human activity of a corresponding nature occurred in Pine Valley. In addition, Pine Valley had fewer adequate stock watering sites and was not utilized as heavily or as soon as was Wah Wah Valley. Wah Wah had been grazed for about 70 years prior to 1940 (about a century now) whereas Pine Valley had been grazed for only about 50 years prior to that time (Stewart, et al., 1940). Early grazing was by cattle only (Stewart, 1940; U.S. Dept. of Interior, 1964). Sheep grazing in large numbers occurred in Wah Wah Valley in the late 1880’s where they were grazed along with cattle already present. Cattlemen in Pine Valley succeeded for about another decade in keeping sheep from that valley.

During the period from 1910 to 1915 forage utilization by livestock was judged to have become seri-ously destructive to vegetation in Pine Valley (Stewart, et al., 1940). Forage use in Pine Valley during the years from 1915 to 1934 reportedly exceeded proper use in nearly the same degree as was common in Wah Wah Valley from about 1885 to 1934 (Stewart, et al., 1940). Changes in vegetation during the extended period of heavy grazing by sheep and cattle resulted in death or reduction of vigor of those plants most readily eaten by livestock (e.g., budsage, black sagebrush, winterfat, and grasses) and in the increase of plants belonging to species which were avoided by livestock because of their being unpalatable (rabbitbrush), moderately palatable (shadscale), or poisonous (horsebrush) (Deming, 1952; Stewart, 1940).

Despite the increase in numbers of some species, reduction of total plant cover also resulted from the heavy grazing pressure (McGuire, et al., 1937). Because of this, erosion proceeded at an accelerated rate, and the Pine – Wah Wah Valley region was designated as being “moderately” to “severely” eroded (Deming, 1952). As early as 1936, it was noted that the pedestaled nature of many desert plants, especially winterfat, showed that from one to six inches of soil had been removed from below the crowns since their establishment. This was true regardless of age of plants. Some were only a few years old and were pedestalized as much as the old plants, indicating recent erosion (Stewart, 1940). Embryonic sand dunes were also noted (Deming, 1952; Stewart, 1940).

Fig. 2. Daughters of Utah Pioneers Monument at the old townsite of Frisco, Utah, Beaver Co., Utah.
The drought of 1934 has been discounted as a major factor in the decline of vegetation and in soil erosion, by various writers (Stewart, 1940, pp. 290-291; Deming, 1952). It has been noted that there was a drought from 1897 to 1904 which was of equal or greater severity than that of the early 1930's. Yet, "fat sheep were marketed on the desert range in midwinter during the decade 1895 to 1904, according to the testimony of resident stockmen" (Stewart, 1940, p. 291). However, as early as the year 1928, more than 4,200 head of sheep out of a band of 5,000 starved to death in Pine Valley (U.S. Dept. of Interior, 1956) well before the drought of the 1930's became severe. "The evidence is that in the early days, the damaging effect of acute shortage of moisture in drought years was offset by moderate utilization, which permitted restoration of the normal growth and nutritional function of the range plant" (Stewart, 1940).

Another change in plant cover demonstrated in many parts of Utah was the invasion of juniper and pinyon from the mountain slopes downward onto the deep alluvial soils of the valleys. Neither pinyon nor juniper are eaten preferentially by grazing animals, and both increase and spread when other plants more readily eaten are grazed excessively. Photographs taken at the townsites of State Line (Figs. 8 and 9), a mining camp in the White Rocks Range at the south end of Hamblin Valley, Iron Co., Utah, in 1909 and 1959 show a striking change in the juniper-pinyon woodland. The trees have increased in number on the hillsides and have extended their range into the lowlands. Even the 1909 photograph demonstrates that the migration was already well advanced, adding support to the idea that native vegetation is rather quickly transformed under heavy grazing pressures. Hamblin Valley is the next valley west of Pine Valley, and the State Line site is comparable to portions of the south end of Pine Valley now occupied by juniper and pinyon also.

Thus, by the early 1930's the public lands under the jurisdiction of the General Land Office were in a generally poor state with regard to vegetation and soil stability.

Public Lands—1933 to Present

From the time when grazing of domestic livestock began in Pine and Wah Wah Valleys in the 1870's and 1880's until 1934, the land was free public domain. It was grazed on a first-come, first-served basis. When the vegetation in one area was depleted another was sought to take its place. However, by the turn of the century almost every part of the range suitable for livestock was being grazed and expansion into new territory became impossible (Hutchings, 1954). Free

Fig. 3. Ghost town of Newhouse, with home ruins in background and smelter ruins right foreground. Wah Wah Valley, Beaver Co., Utah.
use of ranges in the arid lands ended when they were brought under management following establishment of the Desert Experimental Range in 1933, and following the enactment of the Taylor Grazing Act of 1934 (see 48 Stat. 1269, 43 U.S.C. §§ 315-3150-1).

Desert Experimental Range

It is impossible to adequately assess the total numbers of animals grazed in Pine and Wah Wah Valleys prior to 1930 or to estimate the carrying capacity (i.e. the total animal-unit months of forage available from a tract of forage land in a given period) of the range. It was possible, however, to detect that the vegetation was in poor condition and that its value for grazing was greatly reduced (McGuire, 1937; Menzies, 1935; Stewart, 1940). Concerned Forest Service people with knowledge of grazing practices initiated the establishment of the Desert Experimental Range in 1933. The range was fenced around the periphery and divided into pastures where experiments in differential grazing and management were established. The most modern methods were utilized in determining vegetation quality and quantity, animal usage, and other data. Cooperators were allowed to graze sheep and cattle in pastures as provided by an overall experimental design (Hutchings, 1954).

A study of 23 years of controlled grazing at the Desert Experimental Range was undertaken in 1958 (Harper, 1959). In that study it was concluded that the most palatable species (i.e. budsage and winterfat) have increased and the less palatable shadscale has decreased in relative importance during the 23-year period under all grazing treatments, except on those heavily grazed in springtime. The same type of improvement was noted for black sagebrush in 1964 (U.S. Dept. of Agric., 1965) and for budsage in 1966 (Wood, 1966). Galleta grass increased in relative importance in all plots which supported that grass in 1935 (Harper, 1959).

It should be noted, however, that the heaviest grazing treatment at the Desert Experimental Range (nine acres per Animal-unit month, or AUM) was thought to be less than that employed by livestock operators in the remainder of Pine and Wah Wah Valleys (roughly six acres per AUM as extrapolated from adjudication figures). An AUM is defined as the amount of feed necessary to sustain one cow or five sheep for a period of one month (U.S. Dept. Interior, 1964, p. 3). Moderate grazing pressures at the Range were stocked at the rate of 13 acres per AUM and light at 18 acres per AUM.
Newhouse shearing sheds and corrals. As many as 200,000 head of sheep were reported to have been sheared here during a single year. Wah Wah Valley, Beaver Co., Utah.

Fig. 5.

Slag dump at the town of Newhouse in the foreground. Pipeline through present-day ranch continuing to the town from Wah Wah Springs is evident on valley floor. Wah Wah Valley, Beaver Co., Utah.

Fig. 6.
Under the experimental treatments at the Desert Experimental Range, the vegetation has been improved and maintained at a high level, and at the same time, livestock grazed there have provided greater economic return in the form of increased yield of wool, lambs, and healthy breeding stock (Hutchings, 1954, 1958).

That the Bureau of Land Management was aware of the studies at the Desert Experimental Range is evident from statements made in 1952 (Deming, 1952, p. 31), when it was noted that “similarity of vegetation and environment makes the results of experimental studies of management of winter sheep ranges applicable in the Milford unit with little adjustment.”

Bureau of Land Management

Prior to 1934, the lands were under the jurisdiction of the General Land Office which was constituted to dispose of public lands, rather than to manage their use. The Taylor Grazing Act authorized the Secretary of the Interior to establish grazing districts from the public domain which in his opinion were chiefly valuable for grazing and raising forage crops. The Secretary was authorized to issue permits for the grazing of livestock on the grazing districts, with preference being given to landowners engaged in the livestock business. He was directed to make provision for the protection, administration, regulation, and improvement of such grazing districts as may be created and to make such rules and regulations and do any and all things necessary to accomplish the purposes of the Act and to insure the objects of such grazing districts, namely, to regulate their occupancy and use, to preserve the land and its resources from destruction or unnecessary injury, and to provide for the orderly use, improvement, and development of the range. He was also authorized to continue the study of erosion and flood control and to perform such work as might be necessary. The Secretary was further directed to specify from time to time numbers of stock and seasons of use.

The Taylor Grazing Act provided for cooperation with other departments of the federal government and with State agencies and local associations engaged in conservation or propagation of wildlife. Furthermore, in order that the Secretary of the Interior might have the benefit of the fullest information and advice concerning physical, economic, and other local conditions in the several grazing districts, it was instructed that there should be an advisory board of local stockmen in each grazing district. These boards were empowered to offer advice on applications for grazing permits, proposed rules and regulations, the seasons of use and carrying capacity of the range, and any other matters affecting the administration of the district.

The Grazing Service, acting under the authority of the Taylor Grazing Act of 1934, began the task of managing a range which was badly depleted according to available evidence. The use of the region as grazing land for livestock was dictated long before the Taylor Grazing Act was passed, and the first business of the Grazing Service was to determine the extent to which grazing privileges should be allowed. The district (Pahvant Grazing District—Utah Number 3), of which Pine and Wah Wah Valleys are a part was established in 1935 and subdivision of the district into management units occurred in 1937 (Deming, 1952). By 1936 livestock operators had received licenses for specific numbers of livestock, evidently based in large part on previous practices of the operators.

Comprehensive range surveys to determine the capacity of the range to support grazing animals were not carried out on the Milford Unit, of which Wah Wah Valley is a part, prior to 1950 (Deming, 1952), and none is known to have been made in Pine Valley prior to that time either. However, “several estimates were made of carrying capacity by applying rule of thumb methods based on advisory board recommendations” (Deming, 1952). As early as 1936 there was a tacit recognition that overstocking existed to the extent of about 30 percent, and that carrying capacity should be set at about 8.65 acres per AUM (Deming, 1952).

Fig. 7. Johnny Staples grave marker, 27 December 1881. This grave is typical of many in a state of decadence. Frisco Cemetery, Beaver Co., Utah.
Fig. 8. Townsite of State Line taken in 1909, Iron Co., Utah. Note sparsely scattered, small trees near town and on slopes in background.

Fig. 9. Townsite of State Line taken in 1959, Iron Co., Utah. Much less bare area is evident between trees in just 50 years of reduced competition with forage species due to grazing.
Fig. 10. Utah State Department of Fish and Game pond partially silted in by a flood. Increased water supplies are the result of cleared lands above. Pond has provided fish up to 18 inches long. Indian Creek, Indian Peak, Pine Valley, Beaver Co., Utah.

Fig. 11. Sheep bedground. The dark area on the knoll in the center background is dominated by Russian thistle. Antelope Valley, Desert Experimental Range, Millard Co., Utah.
Fig. 12. Watering trough and tank east of Wah Wah Spring. Water is available during winter for livestock but unavailable for wildlife in other seasons. Wah Wah Valley, Beaver Co., Utah.

Fig. 13. Woods’ cabin and well. The effect of high concentrations of livestock is evident for several hundred yards in the immediate vicinity. Pine Valley, Beaver Co., Utah.
Fig. 14. A highlined juniper indicating severity of use by livestock. This could have occurred in a severe winter or by heavy use during long periods of grazing. The effect is usually rather permanent. North end of Pine Valley, Millard Co., Utah.

Fig. 15. Russian thistle and scattered shrubs on terrace of ancient Lake Bonneville. Trees indicate the termination of a pipeline. South end of Wah Wah Valley, Beaver Co., Utah.
Fig. 16. A halogeton stand, made possible by overuse of the more palatable species that previously occupied this area. BLM land. North end of Pine Valley, Millard Co., Utah.

Fig. 17. Stock watering pond and adjacent depleted land. Pipeline to Newhouse evident on right background. Wintch Ranch, Wah Wah Valley, Beaver Co., Utah.
Fig. 18. Manure and devastated vegetation in corner of pasture. BLM Land in north end of Pine Valley, Millard Co., Utah.

Fig. 19. Fence-line contrast. BLM land on right dominated by halogeton. Desert Experimental Range on left dominated by native shrubs and grasses. North end of Pine Valley, Millard Co., Utah.
The Milford Unit recorded some 75,141 sheep and 952 cattle in 1936, but the number of AUM's is unknown due to continued common use practices by the operators. Between 1936 and 1950 the number of sheep declined to 58,577, but the cattle numbers increased to some 2,137. Animal-unit months are recorded for all years between 1939 and 1950. In that 12-year period the average number of AUM's for both cattle and sheep was 87,062. However, in 1950 it was recognized that for the Milford unit, "because of acreage differences in various tabulations, it appears that an estimated grazing capacity of approximately 70,000 AUM's has been accepted as a working basis or goal" (Deming, 1952). Thus, the average stocking rate in the Milford Unit from 1939 to 1950 was recognized to exceed estimated carrying capacity of the range by about 17,000 AUM's.

Pine Valley was adjudicated (i.e. the procedures of determining forage production and its equitable apportionment among livestock operators in a grazing unit) in 1956 and Wah Wah Valley in 1962. The total number of AUM's allowed following adjudication was 27,389 in Pine Valley and 29,611 in Wah Wah Valley (or about 12.9 acres per AUM based on estimated 738,000 acres of Public lands in the two valleys). These figures represent an average reduction of 32.8 percent for Pine and 53.0 percent for Wah Wah (Bayless, 1969; U.S. Dept. of Interior, 1956). Although detailed surveys of the vegetation have not been made since adjudication, there is evidence of general vegetation improvement (Bayless, 1969; Brough, 1969; Burt, 1969; Cropper, 1969; Holmgren, 1965) on the federal lands.

ENVIRONMENTAL CONSIDERATIONS

With many thousands of acres of juniper-pinyon woodland available for management, it would seem that further emphasis needs to be placed on evaluation of their highest potential use. Pinyon is valuable as firewood, as Christmas trees, and as a source of edible seeds. Juniper is cut for fence posts. The harvest is regulated by the Bureau of Land Management. However, information on highest potential use and sustained yield production is unknown. It seems that management policies are necessary.

Evidently, further destruction of the grazing resource base can be avoided by following regulations and policies now in effect. However, there are problems of long standing which are not solved entirely by changes in AUM's or by reseeding operations. Some of the problems are illustrated by observing the permanent influence of sheep bedgrounds (Fig. 11), where Russian thistle, a weedy, Old World introduction, now occupies these bedgrounds even after 30 years of not being used for this purpose. Where watering troughs (Fig. 12), shearing sheds (Fig. 5), or dwellings and corrals for base operation of ranches (Fig. 13) have been located there is evidence of low quality (Figs. 14 and 15) or even poisonous plant (Fig. 16) introductions into the area. These sites are not only detrimental to good grazing practices, but are unsightly blights on the landscape (Figs. 17 and 18). These evidences of vegetation response to man's activities further emphasize the fact that the plant community or ecosystem achieves a complicated balance only after many years of change. The balance is so delicate that whenever a deteriorating influence such as overgrazing or trampling is introduced the effect is immediate and of long duration. The incidence of high animal concentrations centrally located associated with the practice of trailing sheep to a water trough or shearing sheds is a practice that can be or has been changed. Certain practices and structures are necessary if grazing is to continue, but some detrimental practices should be altered or abandoned altogether. Even though the general quality of forage plants is improving, there are still differences between
vegetation under controlled grazing within the Desert Experimental Range and the Public Lands outside (Figs. 19 and 20) where grazing pressure has been much heavier. Vegetation changes which have resulted from poor grazing practices certainly point the way for improvement in quality that seems so necessary.

Less desirable and low quality or poisonous forage plants can be replaced by species that will improve the habitat for livestock as well as wildlife. Enlightened management practices, such as the adjudications of 1956 and 1962, can result in betterment of range-lands (Fig. 21) and rehabilitation through removal of undesirable species; and reseeding (Figs. 22 and 23) can also result in better forage production.

By maintaining good management practices the in-roads of undesirable or poisonous Old World plants can be kept at a minimum. Prior to 1934, cheat grass, Russian thistle, and horehound were introduced to Utah and found adequate habitat in our grazing lands. Between 1934 and the present, the poisonous plant halogoneton spread throughout our winter sheep ranges, and another poisonous plant, henbane, was noted in Pine Valley in 1962 (Holmgren, 1965) and is spreading along sheep bedgrounds and trails.

The practices of water development to include wildlife as well as livestock have been largely neglected. Many water development programs have been principally concerned with providing livestock with water. The development of watering troughs and storage tanks close to the water source, or the practice of piping water to remote locations has resulted in making water less available for many wildlife species. Inasmuch as water development is the key to increase in numbers of antelope and probably of other species as well, it would seem that provisions could be made for concurrent use of water by both wildlife and livestock (Fig. 24).

Continuous, poor road-grading practices have resulted in year after year lowering of the roadbed below the level of the adjacent terrain. A windrow is often produced on the down-slope side of the road (or on both sides) and has changed the roads into "canals" (Figs. 25 and 26) running along and often downhill for long distances. Runoff from excessive rainstorms collects and contributes to erosion of great magnitude. During winter storms, the roads become drifted in and impassable whereas the surrounding areas are free from snow. With unnatural water diversion the vegetation has been altered, often with a complete change of dominant species in many areas in Pine and Wah Wah Valleys. The maintenance of roads on Federal Lands is done by the counties which are subsidized by the state which in turn receives Federal Funds for this purpose (Keough, 1969).

Proper grazing practices may make it necessary to build access roads, fences, corrals, and certain ranch buildings. The Bureau of Land Management has policies regulating the location and construction of buildings and other structures, but some facilities leave much to be desired (Fig. 13). State and Federal policies often lack consistency. State land policy allows for the construction of lambing sheds on land contiguous to Federal Lands even though they are not allowed on Federal lands (Fig. 27). The effects of such a structure on vegetation of adjacent Federal Lands, even though it is built on State Lands, are the same. Animals are concentrated and vegetation is destroyed. The same is true for such structures on private property surrounded by Federal Lands.

Nongrazing practices that have contributed to environmental changes are those resulting from mining and mining-related enterprises (Fig. 6). Abandoned mine buildings and machinery (Fig. 28), old coke ovens (Figs. 29 and 30), a smelter (Fig. 6), a foundry (Fig. 31), the railway, townsite, homesite (Fig. 32), and graveyard (Fig. 7) are all evident in the area considered in this study. Modern mining exploration is evident also. Enlightened range management practices do little good if it is possible to explore for minerals in any manner whatever without regard to the Bureau of Land Management's supposed regulation of Federal Lands. Here State and Federal regulations differ. To explore for minerals on State Lands requires a permit from the State Land Board (Crystal, 1969). However, any part of the Federal Lands can be explored by bulldozer, plow, shovel, or any other means as long as State filing laws are followed (U.S. Dept. of Interior, 1964). The Bureau of Land Management finds out about the exploration only after the fact.

Attempts at ranching and farming have also left their marks on the landscape in the form of fields (Fig. 33), abandoned farmsteads (Fig. 34), springs (Fig. 4), and cemetery (Fig. 1). Many of the abandoned structures are of significant historical value and are in need of preservation. Others are eyesores and should be obliterated.

Although there is a stated policy by the Bureau of Sport Fisheries and Wildlife concerning the animal damage control programs, it appears that certain indiscriminate killing of questionable problem animals does occur (Durrant, 1952, p. 449). This problem is compounded by both private and government trappers working a region without correlation of results. A total list of animals killed and dumped along a crossroads junction for all to see on December 13, 1969, included two badgers, two bobcats, five gray fox, one kit fox, and one long-eared owl (Fig. 35). These were apparently taken by a private individual, but the region is also marked as containing cyanide devices and the poison "1080" (Ridgeway, 1969).

If "it is the objective of the Bureau to reduce animal depredations as selectively as possible" (U.S. Dept. of Interior, 1964, p. 5), then a lack of proper execution of the policy occurs at the local level. Federal, State, and County programs need further
Fig. 20. BLM land on left of fence with unpalatable rabbitbrush as the dominant vegetation. Desert Experimental Range on right with highly preferred black sagebrush as dominant. Antelope Valley, Millard Co., Utah.

Fig. 21. Galleta and Indian ricegrass with a shrub mixture. This photo gives evidence of high potential productivity where grazed every other year in the spring. Desert Experimental Range, Pine Valley, Millard Co., Utah.
Fig. 22. Reseeding in cleared juniper-pinyon woodland on BLM land. Useable forage increased 10 to 100 times. South end of Wah Wah Valley, Beaver Co., Utah.

Fig. 23. Successful reseeded area of intermediate wheatgrass. Seeds were drilled in after chaining, windrowing, and burning of trees. Noncleared area provides cover for wild game. South end of Pine Valley, Beaver Co., Utah.
Fig. 24. Permanent pond available for use by both livestock and wildlife, near Wah Wah Spring. Wah Wah Valley, Beaver Co., Utah.

Fig. 25. Roadway diversion of natural drainage causing change in vegetation type. Four-wing saltbush on left and scattered shadscale on the right. South central Pine Valley. BLM Lands, Beaver Co., Utah.
Fig. 26. Halogeton and windrow lined roadway. The road now acts as a “canal” during periods of heavy rain. North end of Wah Wah Valley, Millard Co., Utah.

Fig. 27. Lambing shed and corrals on State Lands in south end of Wah Wah Valley, Beaver Co., Utah.
Fig. 28. Abandoned mine buildings and mine dump, Frisco, Beaver Co., Utah.

Fig. 29. Wah Wah Valley from Kiln Spring showing young juniper invasion onto lower slopes, Beaver Co., Utah.
Fig. 30. Charcoal kilns at Kiln Spring, Wah Wah Valley, Beaver Co., Utah.

Fig. 31. Slag pile from old iron works. West side of Wah Wah Valley, Beaver Co., Utah.
Fig. 32. Abandoned buildings, Squaw Spring, Wah Wah Valley, Beaver Co., Utah.

Fig. 33. Winter Ranch alfalfa field. About 40 acres irrigated from Wah Wah Spring, Wah Wah Valley, Beaver Co., Utah.
Fig. 34. Abandoned farmstead in foreground with modern corral in background. Wah Wah Valley, from Wah Wah Spring, Beaver Co., Utah.

Fig. 35. Cadavers of two gray fox and a bobcat abandoned after most valuable pelts had been removed. South end of Pine Valley, Beaver Co., Utah, 13 December 1969.
enlightenment through research and coordination before the objective is achieved.

An illustration of problems arising from high rabbit populations (possibly as a result of low predator numbers) is to be found in attempts at reseeding a cleared, juniper-pinyon area by the Utah State Department of Fish and Game. In 1963 they were forced to redo some 500 acres of land initially reseeded in 1958 in the Indian Peaks region of Pine Valley. Small acreage reseeding projects in the south end of Wah Wah Valley may be doomed to failure because of the high numbers of rabbits feeding on the newly planted vegetation (Brough, 1969).

SUMMARY AND CONCLUSIONS

The Public Lands in Pine and Wah Wah Valleys have been grazed since about 1870. Evidence indicates that the lands were stocked at excessive rates for more than 30 years prior to establishment of the Taylor Grazing Act in 1934. Excessive stocking resulted in deterioration of high quality grazing plants among the desert shrubs and grasses, in the reduction of total plant cover, in the increase of less desirable native plants, in introduction of weedy and poisonous plants, and increase in extent of juniper and pinyon, and in accelerated soil erosion.

The Desert Experimental Range has provided a model for good grazing and management practices which result in improvement and maintenance of desert vegetation.

The Bureau of Land Management inherited a badly abused resource base in the 1930's, and during the period 1935 to 1950 recognized that the land was stocked at rates in excess of carrying capacity. While the trend in AUM's was downward during that period, it appears that overstocking continued largely because of economics and local custom. During the 1950's and 1960's the lands in Pine and Wah Wah Valleys underwent adjudication and the number of AUM's was cut by 32.8 percent and 53.0 percent respectively. In that same period the Bureau of Land Management cleared and reseeded some 34,500 acres of juniper-pinyon woodland. Thus, since the mid-1950's there has been a general improvement in the vegetation resource base.

Problem areas are still evident. These require additional study, funds, and personnel. The entire Pahvant Grazing District consists of some 5,500,000 acres. Yet, there are only six professional management personnel on the entire staff. In the Pine - Wah Wah Valleys region a single person is directly responsible for management.

Where vegetation is in poor condition due to crowding around water holes or other places, studies need to be made which will lessen the effects or do away with them.

There is need for closer cooperation and coordination of Federal, State, and County agencies to insure ease of management and lack of cross-purposes. Laws to allow more free exchange of state school lands should be enacted. The 1870 mining laws should be modified to prevent destruction of Federal lands in the name of mineral exploration. Federal and State agencies should correlate predator and fur-bearing carnivore kill with rabbit and rodent populations, and with changes in the vegetation resources which result as a consequence of carnivores killed.

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